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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



NEUTRONS

Neutrons From Fusion?

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A SCIENCE SERVICE PUBLICATION

PHYSICS

Rocket Probes Magnetism

AN "OPTICAL PUMP," capable of measuring highly attenuated interplanetary magnetic fields, has been recommended for inclusion in instrument packages of future rocket probes.

It can measure extremely weak fields at great distances from their sources with precision unmatched by any other known instrument, Dr. Arnold L. Bloom, a physicist with Varian Associates, Palo Alto, Calif., reports in *Naval Research Reviews*.

Although the instrument bears no physical relationship to the familiar water, compressed air and vacuum pumps, it holds one principle in common with the others. It raises substances to a permanent condition of higher potential energy.

Using a light beam, it pumps new energy into atoms.

Dr. Bloom says the optical pump uses quantum mechanical principles.

Every atom is capable of assuming a number of possible quantum states or total energy. With each change in total energy, there is a subsequent change in some properties of the atom.

In the pump, when a specific wavelength of light is directed at, for example, sodium vapor, the energy of the sodium atoms increases. It jumps from what might be called state "A" to state "C."

However each atom tends to revert back to its lower energy state. It is equally probable the reversion will be back to state "A" or to state "B."

State "B" is not excited by the same wavelength of light. The atoms assuming state "B" are "trapped." The light causes state "A" atoms to continue their energy jumps up to "C" and back down until virtually all of them eventually are trapped in the "B" state.

The transparency of the sodium vapor increases as more atoms reach the "B" state. Thus, success of the pumping is measured by intensity of the light passing through the vapor.

Magnetic fields impressed on the vapor affect its energy level. Measurements of energy level changes reveal the strength of the magnetic field.

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GYNECOLOGY

Fetal Sex Still Unknown

EXPECTANT MOTHERS still face the ancient and perplexing problem of whether to knit blue or pink booties, despite the advances of this scientific age.

Although scientists appear to be near to perfecting a reliable method of predicting the sex of unborn babies, the present "wait and see" policy remains the best.

One of the latest scientific methods, which could be the answer to the problem, involves analyzing the amniotic fluid of the pregnant woman. No claims have yet been made as to its accuracy, however.

Scientists and pseudo-scientists have engaged in one of the most frustrating guessing games in the past 4,000 years of history.

The superstitions relating to the prediction of fetal sex illustrate in fascinating manner the credulity and skepticism of mankind, its bondage to tradition, and its flights of rationalization and imagination, Dr. Thomas R. Forbes of the Yale University School of Medicine reports in the *Proceedings of the American Philosophical Society*.

The oldest method on record goes back 4,000 years to the Egyptians. They recommend, in writings on ancient papyrus, that a mixture of dates and sand be placed in two flasks. Add barley or spelt to one, wheat to the other, after soaking each in the urine of the pregnant woman. If the wheat sprouts first, a son will be born, if barley, a girl.

Even Hippocrates, the father of medicine, got into the guessing game by describing both tests and physical signs for determining fetal sex. He believed that boys develop on the right side of the uterus and girls on the left. Therefore, if the fetus were a boy,

the right eye of the mother would be brighter and clearer and her right breast larger. If a girl, the opposite side would show these signs, he said.

The persistent belief that the male baby would be brighter or stronger or more active during pregnancy dominated the thinking of people down through the ages. Even today there is the saying that an active fetus will be a boy.

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PUBLIC HEALTH

Strontium-90 Level Soars Above Safe Amount

SAMPLES OF ALFALFA hay grown in Minnesota and South Dakota have been found to contain more than 10 times the maximum permissible level of strontium-90.

These figures, and others, were released by the Department of Health, Education and Welfare. They are based on samples tested in October, 1958.

Other samples of strontium-90 levels showed that alfalfa hay grown in Nebraska contained one and one-half times the permissible level, and those grown in Maryland almost eight times the permissible level.

Samples of the beta radioactivity of alfalfa hay and ensilage were studied in 19 states. Only the above four were studied for their strontium-90 count.

The maximum permissible level of strontium-90 has been set at 80 micromicrocuries per liter or kilogram in the entire diet over a lifetime. This standard was set by the

National Committee on Radiation Protection and Measurements.

Health officials in Washington, however, expressed the belief these newly detected high levels are not dangerous. Available evidence indicates that the amount of strontium-90 appearing in milk is considerably less than the amount of strontium-90 in the cow's diet. Yet, health officials say they do not know exactly how much of the dangerous isotope travels to the milk and meat of the cow.

When asked about foods that are grown in these areas and consumed directly by humans, Food and Drug physiologist Dr. Edwin Laug said that normal processing, that is, washing and blanching of vegetables, should remove most of the radioactivity.

However, the exact amount that is removed by this method has not been determined. The U. S. Public Health Service plans to examine the radioactivity of 473 samples of 50 varieties of food grown throughout the country.

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CHEMISTRY

Strong New Plastic Challenges Metals

A TOUGH, RESILIENT plastic that will substitute for many metals has been developed. It is called Delrin and is the product of Du Pont scientists in Wilmington, Del.

Plastics heretofore have not been strong enough to compete with metals in many applications. Now, Delrin promises to be usable for car door handles, dashboards of cars, fuel pump and carburetor parts, and showerheads. More than 75% of its potential applications, which number more than 500, involve replacement of steel, brass, aluminum and zinc.

The reason for Delrin's excellent properties lies in its chemical structure. It is formed from formaldehyde, a relatively simple molecule. The formaldehyde is polymerized, or joined together in long, tightly-packed chains. These unbranched chains form into very dense crystals giving the plastic its strength and unique ability for long wear.

The first usable polymer of formaldehyde that has been developed to any great extent, Delrin is being commercially manufactured by E. I. du Pont de Nemours & Company. It required 300 man-years of experimental work to develop a stable form of the polymer, and the development costs exceeded those spent by the company to produce nylon.

Delrin cannot replace metals completely, however. It cannot be easily cemented, and is discolored by ultraviolet rays, a characteristic of most plastics. Whether Delrin will be practical for very large shapes is not yet known. A garbage can liner is the largest thus far successfully made and tested.

Many companies are already interested in Delrin as a metal replacement, and polyformaldehyde seems to be on the brink of assuming considerable industrial importance.

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PHYSICS

Control Fusion Reaction

Controlled fusion may have been achieved for a tiny fraction of a second. The gas or plasma is believed to have been stable for about 10 microseconds.

See Front Cover

A CONTROLLED THERMONUCLEAR reaction in the laboratory is believed to have been obtained for a tiny fraction of a second by scientists at the Naval Research Laboratory in Washington.

They hope to verify their harnessing of the forces released in nuclear fusion within a year, using a larger device they estimate will cost some \$20,000,000 to build. With the present small device—the heart of the apparatus is only 12 inches long—they report a major step toward using thermonuclear processes for controlled production of power.

While Dr. Alan C. Kolb of NRL reported his research findings with the "high density magnetic mirror machine" at the Fourth International Conference on Ionization Phenomena in Gases at Uppsala, Sweden, his colleague, Dr. W. R. Faust explained implications of the research in Washington.

Dr. Faust said the experiments had shown three important new developments:

1. The gas, known as a plasma, was contained for a long time relative to the time required for normal thermal distribution to occur.

2. The length of time during which neutrons, neutral particles produced during thermonuclear fusion, are emitted is in agreement with theoretical calculations of plasma physics.

3. The plasma is observed to be stable during approximately ten microseconds (millionths of a second) in which neutrons are observed.

In the photograph shown on the cover of this week's SCIENCE NEWS LETTER, the correlation of neutron emission with plasma radius and magnetic field strength is shown. Neutrons are emitted for a period of two microseconds.

Dr. Robert Page, director of research at NRL, estimated it would take 20 to 40 years to reach the point where power from thermonuclear reactions would be economically practical. He said scientists were just beginning to learn about plasma physics, and likened the step taken by the NRL scientists to that of a piece of paper turning brown when a match is held to it—burning would require its turning red hot before bursting into flame.

Dr. Kolb's approach is to compress deuterium preheated by a shock wave using an extremely high magnetic field. Energy re-

leased from an internal magnetic field and further magnetic compression bring the temperature up to its final value. Comparison between magnetic pressure and gas pressure indicates that the temperature is the order of 20,000,000 degrees absolute. This temperature is consistent with that necessary to produce the observed neutron yield by thermonuclear reactions.

The experiments were part of a high temperature physics program jointly financed by the Navy and the Atomic Energy Commission to the tune of about \$1,500,000 during the past three years. If present findings are confirmed, an important milestone has been reached in the process of obtaining useful power from the virtually unlimited supply of energy locked in the nuclei of deuterium.

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PHYSICS

Radar Detects Missile Launchings

AN EXPERIMENTAL RADAR that detects ballistic missiles launched thousands of miles away has been developed by Navy scientists.

The new method could also be used to detect nuclear explosions at faraway points. It depends on the spotting of large volumes of ionized gas generated when missiles or satellites are launched or nuclear weapons exploded.

The detection is based on a new kind of radar—high frequency ionospheric back-scatter radar. Conventional radar is limited in range in the same way and for the same reason that television is, because the waves travel in a straight line.

Ionospheric back-scatter radar resembles radio. The waves sent out by the transmitter are reflected by the ionosphere. When a large rocket is fired or a nuclear bomb detonated, the hot exhaust gases are ionized and reflect the radar waves in much the same way as the ionosphere.

Putting these facts together led Dr. William J. Thaler of the Office of Naval Research to conceive of the possibility of warning of a missile attack by this means. The project to develop the new radar method is called Tepee.

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PSYCHOLOGY

Scientists to Study Brainwashing Immunity

THE "SHOTS" that the American serviceman receives in future may include a psychological shot against propaganda and brainwashing as well as the familiar typhoid, tetanus or diphtheria inoculations. Psychologists under the direction of Prof. William McGuire of the University of Illinois are attempting to develop a method of immunizing against persuasion by gradually building up a resistance to propaganda as hayfever victims are given defense against pollen. The study is being made possible by a grant from the National Science Foundation.

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TEPEE—Dr. William J. Thaler (right) and Edwin Lyon operate the radar system which is capable of detecting missiles at 5,000-mile ranges seconds after being launched.

SCIENTIA INTERNATIONAL

NOVAS DEL MENSE IN INTERLINGUA

Medicina Veterinari.—Canes, como humanos, suffre de febre de feno con omne le symptommas classic de descarga de muco nasal, prurito, e inflammation del oculos. Dr. R. Patterson del Universitate Michigan reporta le caso de un tal patiente canin in que le administration de antihistamina alleviava le symptommas multo satisfactamente.

Astronautica.—Explorator VI, le plus recente satellite american, ha un peso de solmente 64 kg, sed su instrumentation es le plus complexe unquam inviate in un viage extra- e circumterrestre. Illo ha "alas de molino," automaticamente displicite post su entrata in orbita, le quales de facto consiste de batterias solar provide un prolongate alimentacion electric. Explorator VI es le prime satellite equipate con un specie de camera de television. Isto va transmittir al humanos le prime primitive portraits cosmic de lor planeta matre.

Ingenieria Marin.—Un systema de climatization pro submarinos es sub disveloppamento per le Radiocorporation de America. Illo fonctionnera sin motores o compresores, utilisante le si-appellate effecto Peltier. Iste effecto es nominate pro le physica francese Jean Peltier qui discoperiva 120 annos retro que le passage de electricitate per le junction de duo dissimile metallos produce calor in un direction e frigore in le altere. Le hic reportate nove climatizatores pro submarinos va funcionar in principio simplicemente per remover, per medio de un fluido circulante, le calor producite per le effecto Peltier.

Phonetica.—Pro patientes qui ha perditte lor capacitate de parlar in consequentia de un laryngectomia, le anglese chirurg dental Dr. R. T. Tait ha disveloppate un dispositivo electric le qual—portate in le bucca e alimentate per un batteria in le tasca del subjecto individual—produce vibrations que normal movimientos del organos de parolation modula in parolas perfecte mente intelligibile ben que un pauco monotone.

Materiales.—Le papiro in libros producite durante le passate 25 annos va deteriorar se multo plus rapidamente que le papiro usate in publicationes de seculos passate. On crede que le reducte "vitalitate" del papiros moderne es le effecto del acidos usate in lor fabrication. Studios es in progresso pro trovar methodos que permittera le neutralisation del acidos in question.

Pedagogia.—Un micro piano ha essite inviente in que le depression de un clave activa un lumine indicante le clave del sono sequente in un melodia particular. Le sequentia del lumes es regulare per un exchambiabile carton perforate.

Demographia.—Dr. R. C. Cook del Bureau de Informaciones Demographic in Washington predice que si le crescentia explosive del populationes in le pais del Oriente Extreme non es retardate intra un o duo decennios, ille pais va nunquam succeder a meliorar le standard del vita del individuo. Le excellent successo del japonenses in regular le crescentia del population non es imitable in altere pais con altere traditiones religiose, social, cultural, etc. Sed le problema debe esser resolvite si on vole evitar resultatos ultimemente tragic e catastrophice. Si le methodos japonese non es applicabile, altere methodos debe esser trovate.

Atomica.—Un theoria formulate per Prof. A. S. Kompaneets del Academia de Scientia Sovietic explica le undas de radio generate in explosiones atomic como causate per le presentia de un corrente electronic in aere ionisate. Iste corrente

produce pulsos de un duration mesurable in millionesimos de secundas e assi undas de radio de un longitudie de circa 1 m. (Radiodiffusiones standard labora con undas de longitudines in le vicinitate de 200 m.)

Astronautica.—Experimentos effectuate in le laboratorios del compania Lockheed indica que astronaves penetrante le atmosphaera del planeta Venera debe esser prepare pro temperaturas de friction multo plus alte que in le caso de Marte o Terra. Le ration es que le atmosphaera de Venera es multo ric in dioxydo de carbon.

Recercas de Arthritis.—In le Statos Unite le incidenta de arthritis inter fermeros e obreros agricultural es quasi duo vices plus alte que in le population general. Le population arthritis del Statos Unite es circa dece-un milliones. Un million de iste total es representate per fermeros.

Astronautica.—Un seismographo pro le registration de tremores de terra in le luna (= "tremores de luna") essera construite per un gruppo de expertos del Universitate Columbia e del Instituto Technologic de California. Le instrumento va pesar inter 10 e 20 libras. Illo essera transportate al luna un rochetta e reportara su observaciones per signales de radio.

Physiologia.—Dr. R. Henkin del Universitate California ha constatate in experimentos animal que ille existe un correlation inter le production del hormon corticosterona e certe qualitates (frequentia, intensitate, etc.) de sonos prevemente audite per le subjecto. Dr. Henkin postula que le reaction del individuo a un pecia de musica es un evento multo complexe que affice le organismo total, incluse le economia del hormones. Previa experimentos de Dr. Henkin ha demonstrate un correlation inter le agradabilitate o desagradabilitate subjective de un pecia de musica e le responsa galvanic del pelle in le subjecto individual.

Pharmacologia.—Al Collegio Pharmacologic Philadelphia, melle ha essite recognoscite como un excellent vehiculo pro varie pharmacos. Certe vitaminas ha un meliorate stabilitate in melle. Le sedimentation de multe pharmacos in iste vehiculo es extrememente lente, e lor remiscimento es extrememente facile. Le palatabilitate de drogas es evidentemente augmentate per le uso de melle, e un re-introduction massive de iste ancian remedio popular con nove functiones pharmacologic essera de importantia pro le agricultura.

Alcoholismo.—Le Statos Unite produce 500,000 alcoholicos per anno. Le nation ha nunc 8,000,000 alcoholicos. Le supervivencia probable pro alcoholicos es 51 annos, in comparison con circa 70 annos pro non-alcoholicos. In le curso del passate 13 annos, le numero total del bibitores ha descendite per 12 pro cento. Pro feminas iste reduction esseva duplo illo pro masculos.

Hospitales.—In 1958, le hospitales stato-unites ha admittite 23,697,000 patientes (700,000 plus que le anno precedente). Le population hospitalisate amontava al media a plus que 1,300,000. Le population neonate in le hospitales amontava al media a 43,000. Le total del nascentias in hospitales durante le anno esseva 3,742,000. In le hospitales pro casos "non-permanente," le duration medie del hospitalisation del patiente individual esseva 7.4 dies. Le costo (pro le hospitales, non pro le patientes) esseva \$29.24 per die (\$24.43 plus que le anno precedente). Le personal employate per le hospitales esseva 111 per 100 patientes (comparate con 107 in 1957).

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GENERAL SCIENCE

Reading Interlingua

YOU CAN READ Interlingua if you had no more than one semester of high school French or Spanish or Latin and flunked it. You can read and understand a great deal of it even if you had never had contact with any foreign language.

Send this page to an acquaintance abroad and tell him that he can get additional information about Interlingua from Dr. ALEXANDER GODE, SCIENCE SERVICE's Interlingua Division, 80 E. 11th St., New York 3, N. Y. Financial contributions to the Interlingua program are needed.

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ELECTRONICS

One-Man Control of A-Sub

AN ELECTRONIC COMPUTER, no bigger than a breadbox, is being developed by the United States Navy to give one man total control over the complex functions of a nuclear-powered submarine.

The new system may permit reduction of A-submarine crews from the present average of 100 to only 12. It is described in *Naval Research Reviews* (Aug.).

World War II undersea craft required a control staff of eight men. Today's atomic subs are guided by three.

Known as SUBIC (Submarine Integrated Control), the system will provide the controller, or commanding officer, with visual displays of all the information he needs to run the ship, in war and peace. The data will come from five fundamental control systems — engineering, communications, weapons, environmental and ship.

These are the same systems that feed data to the numerous dials on today's instrument panels. The small, 40-pound SUBIC computer, capable of making 15,000 computations a second, will convert the raw data into simple television pictures.

In weapons control, for example, SUBIC provides a picture display that continually indicates the identity, position and movement of each target, as well as the submarine's own position and movement.

The engineering control display will indicate power-plant operation and status. In addition, SUBIC will provide an automatic means for effecting power-plant

changes to compensate for changing conditions.

In communications control, SUBIC will utilize an automatic receiver-transmitter and an automatic coder-decoder unit.

Automatic monitoring, detection and elimination of air-supply contaminants will be part of the environmental control system. Also in this category will be damage detection as displayed on a television screen.

Ship control will include bathythermograph and other information on screen displays.

SUBIC is adaptable to small "killer" submarines and large ballistic-missile submarines, both of which have one-man airplane-type manual controls.

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PUBLIC SAFETY

"Nuclear Attack" Shows Non-Trained Can Help

A MOCK NUCLEAR ATTACK in Montgomery, Ala., demonstrated how effectively an ordinary citizen can help his injured neighbors who survive an atomic attack.

A 25-pound pack of TNT was detonated in pitch darkness, creating the effect of a nuclear explosion, complete with orange mushroom cloud. Non-medical persons treated "casualties" who had suffered the types of injuries expected to occur to persons 15 miles from the blast of a 10-megaton

bomb, the equivalent of 10,000,000 tons of TNT.

Moments after the blast, "victims," some wearing moulage wounds and others wearing make-up, demonstrated such injuries as burned faces, ruptured arteries, fractured arms and legs. Some wandered aimlessly in circles, the victims of shock.

Those persons able to move about quickly began applying artificial respiration where needed and tourniquets to potential amputees. The actors in the demonstration were male and female personnel from Gunter Air Force Base.

Several men brought an emergency "buddy care" training kit, developed at the Gunter Branch of the School of Aviation Medicine, from a nearby building. Other men gathered and began bandaging the wounded, covering them with available blankets, and administering first aid.

These men had had no medical training except for instruction by other non-medical persons on the use of the medical kit.

The demonstration pointed out the probability that persons in the range of such an atomic attack will suffer injuries from fires, auto wrecks and radiation. However, some of these men and women, slightly injured, with as little instruction as 25 hours of first aid training, were able to save the lives of many of those incapacitated. Each branch of the military service now plans to include this instruction in the training program of every enlisted man.

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BOTANY

Powerful Pond Poisons Isolated by Scientists

"BLOOMING" PONDS and lakes can poison a farmer's livestock almost before he knows what is happening.

Now the complicated story behind these poisonings from scum-covered water is being simplified and some of the killer substances identified, a team of Canadian researchers told scientists at the International Botanical Congress meeting in Montreal.

A substance released when blue-green algae decompose—an endotoxin—is one of the lethal substances. It causes death quickly in very small doses, Dr. P. R. Gorham of the National Research Council of Canada reported. Huge amounts of dried algae cells were needed to extract and identify the fast-death toxin. Cells from the blue-green algae called microcystis have been mass-cultured, Dr. Gorham said, and the cells were toxic when given orally to sheep, calves and smaller animals.

Analysis and tests showed the endotoxin is an acid. Further research identified it as a toxic peptide that is quite stable.

There is also a slow-death factor, Dr. Gorham explained. This is caused by bacteria associated with the blue-green algae. Much larger doses of the bacteria are needed. One of the five bacteria found contaminating the researchers' algae culture produces the slow-death symptoms found in nature.

Co-workers with Dr. Gorham are Drs. B. Simpson, C. T. Bishop, E.F.L.J. Anet.

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SIMULATED CASUALTIES—Men and women, with as little instruction as 25 hours of first aid training, are shown helping the injured, after a mock nuclear attack in Montgomery, Ala. The "bomb," detonated at night, was a 25-pound pack of TNT.

EDUCATION

Raising a Future Scientist

A Science Service study of the parents of the winners of this year's Science Talent Search obtained answers to questions about the upbringing of these promising young scientists.

By SHIRLEY MOORE

FAMILIES who "care" and homes where learning is valued for its own unique satisfaction are significant influences in the development of future creative scientists.

In a SCIENCE SERVICE study, the parents of 40 outstanding young scientists were asked to describe various factors involved in bringing up their talented children. The young persons, all high school seniors, are the top winners of the 18th Science Talent Search for the Westinghouse Science Scholarships and Awards, conducted by SCIENCE SERVICE through its Science Clubs of America.

Sorting through 16 or 17 years of intimate experience, these mothers and fathers have chosen some general principles they would suggest to parents eager to encourage full development of their children's abilities.

From the very beginning, for example, they believe it is important to foster such habits and traits as independence, intellectual curiosity, perseverance, responsibility, creativity and modesty.

More than half of these parents emphasize the value of providing science books, basic materials, and equipment as specific kinds become interesting and necessary. Supplying such background need not, and probably should not, entail very much expense since children's early interests sometimes are waystations on a journey toward intense involvement in quite different fields.

Research Encouraged

Searching out information from various sources and devising equipment through ingenious use of accessible materials not only are less expensive but also provide invaluable experience in themselves.

Discussing this, one mother urges, "Give him time. And be patient when his interests lag, or change."

A father comments, "We avoided buying children's encyclopedias because we felt they were too easy and restrictive. It seemed preferable for him to go out and dig up the material himself. . . . While it is essential for parents to foster and fulfill a youngster's interest, it is dangerous to go too far and hand him everything on a platter."

Several parents mention the special role of genuine interest, generous encouragement and honest criticism from mothers and fathers. Such sharing and guidance, not pushing, in the direction of the child's own interest are explicitly described or taken for granted by virtually all of these parents.

Considered equally valuable are family activities and expeditions that expose a child to a variety of scientific fields in a sort of potpourri of stimulating experiences. Such

wide acquaintance with the scientific world should be balanced by emphasis on what one parent calls "living values," to develop appropriate perspective.

When it comes to what to do about school, it is advised that youngsters should be encouraged to earn good grades for work well and honestly done and to accept the challenge of top level courses, rather than to choose "snap" courses. If it happens that the school curriculum is somewhat less than ideal, extra opportunity for learning can be devised at home and in the community.

It is the opinion of most of these parents that a child's potential is most likely to develop in a family atmosphere of enjoyment of learning, stimulating talk, and "appreciation of the wonder of the everyday commonplace." Such an environment would, of course, include some freedom to explore and experiment, and it follows that being a successful parent of a science-prone child demands a willingness to help him find answers.

As one father puts it, the "right" books, information, and resources must be discovered at the "right" time."

A number of parents mention the effec-

tiveness of compatible companions and clubs in the development of youthful interest and ability. Others point out the prime necessity of a "private place" for a budding scientist to work and to leave his current projects undisturbed and as untidy as they sometimes must be.

Community acceptance and recognition of a youngster's efforts, which are described as very stimulating factors in his or her continued and deepening development, may be attained through encouraging students to enter science fairs and other types of science competitions, it is suggested. Some of the parents believe that such recognition may be decisive in fanning a tentative spark of interest into a flame of dedicated conviction.

Sources of Inspiration

Summing up the strongest influences upon their own children's growth, the responses of this group of parents create a picture of how latent ability becomes focused and gets into productive action.

Prominent in this picture are the persons in a possible-scientist's life and the experiences they make possible for him. Inspired teachers, sympathetic and helpful adult scientists, and a warmly encouraging family can, between them, create nearly ideal conditions for a young person's discovery of



EARLY ENCOURAGEMENT—An interested mother lends a helping hand as her pre-scientist son and his friend work on their current science projects. In a recent SCIENCE SERVICE study, the parents of the nation's most promising young scientists emphasized the importance of such encouragement and of providing a "private place" for a youngster's experimental work.

his personal niche in the scientific adventure.

Sixty some teachers of 33 of the young people are particularly cited for their personal interest in the student and/or his project, for their influence in originating or developing science interests, or for their example of informed and contagious enthusiasm. These teachers were important at ages ranging from five to 17, but the peak of their influence occurred when the students were between 13 and 16.

Thirty-two scientists were catalysts in the lives of 17 of these girls and boys, beginning as early as when they were eight years of age and reaching a high point at 15 and 16. The scientists are described as having inspired their youthful proteges through their advice and help on projects, their instruction in techniques, their conversation or the example set by their own obvious zest for discovering answers.

Although it is evident from the responses of virtually all of these parents that they have provided consistent encouragement of whatever talents their children showed symptoms of possessing, there are also 20 special mentions of one or both parents, other family members, or close family friends as having been wholly or partly responsible for originating the scientific glow or fanning the flame in 14 of the students through discussions, reading, trips to places of significant interest, constant support of effort and study, or demonstrations of the hows and whys of science.

From two or three years of age until about 12 such play materials as jigsaw puzzles, tinker toys, erector sets, beginner's chemistry sets and simple microscopes were important and absorbing, according to 78% of the parents.

After 11 or 12 years of age, these potential scientists put aside such relatively childish materials in favor of finding or creating their own hobby equipment for such leisure interests as collections, astronomy, photography, radio and electronics, outdoor studies, chemistry and mathematics. Reading, music and various forms of art are also contributive hobbies among these teen-aged scientists.

Love of Reading

Most of them have been ardent readers (or listeners) as long as they or their parents can remember. Scientific magazines, encyclopedias, science, mathematics, and astronomy texts, and science fiction, in that order, have been the most popular reading materials.

Although this love of reading is not surprising, the early ages at which really technical books were sought out and appreciated seems rather remarkable. For some of these children science textbooks were favorites as early as seven or eight, such books as Dr. George Gamow's "One, Two, Three, Infinity" and "Birth and Death of the Sun" at 10, 11 and 15, and comprehensive discussions of higher mathematics and mathematical reasoning as early as 13 and 14.

More than a hundred listings are made of some 37 periodicals that are read regularly and productively by these students. The pub-

BIOPHYSICS

Electricity Kills Tumors

Cancerous tumors have been killed in mice without harming the animals. An electrical current caused 60% of mouse tumors to shrink and drop off.

ELECTRICITY can successfully kill tumor cells without harming normal tissue.

Two research scientists report in *Science* (Aug. 14) that they used an electrical current to kill cancerous tumors in mice without harming the animals.

Tissue of tumor sarcoma 180 was injected between the shoulder blades of Swiss albino mice. Tumors quickly began to grow at these points of injection, E. H. Seal of the Applied Physics Laboratory, John Hopkins University, said.

Then a plastic saddle was fastened to each mouse. The saddles contained a copper electrode covered with sponge rubber that had been soaked in a solution of water and table salt.

Each "saddled" mouse rested upon a rod covered by copper and sponge rubber. Electricity flowed from the saddle, through the tumor, to the rod upon which the mouse was fastened. The current was controlled to prevent burning the skin tissue. Each mouse was treated for an hour and then allowed to rest for an hour.

Control mice also received tumor cells between their shoulder blades and wore the saddles and equipment, but they did not receive any electrical current. Within 21 days, all controls died, presumably from the effects of the tumor growth.

The mice receiving the electrical current, however, were in good shape after 21 days.

lications range from well known science magazines such as *SCIENCE NEWS LETTER* and professional journals to "Pogo" and *The New Yorker*.

Asked about television and radio, 40% of the parents answered that they were not influences in their children's development. (Three families do not have television sets; one did not until the child was 12 years old.) On the other hand, 23 parents believe that radio and television programs have been valuable. Nineteen parents mention science programs and five cite science-fiction features.

Visits to museums, National Parks, planetaria and observatories, and scientific laboratories receive 65 mentions. Science clubs, seminars and societies are considered valuable by 26 of the 40 sets of parents, and 14 believe that early science activities in Boy and Girl Scouts of America have been productive.

More than half of the parents agree it is helpful to emphasize that it is doing and not winning that is important, to provide opportunities for contact with adult scientists, and to welcome groups of young scientists to their homes.

It is significant to note that these parents are alike chiefly in their vital interest in

More than 60% of the tumors of these mice had shrunk and dropped off, leaving a new skin surface where the tumor had originally grown. The remaining animals died later, probably from the effects of the tumors still growing.

Similar work with another tumor, "C 3 H," did not give such satisfactory results, Mr. Seal said. The studies were directed by the late Dr. Carroll E. Humphrey.

Science News Letter, August 29, 1959

MEDICINE

Control Child's Diabetes Better With Oral Drug

AN ANTI-DIABETIC pill promises better control of the disease in children than other oral drugs now in use.

This was reported by Dr. Samuel J. H. Sugar and his associates at George Washington University School of Medicine.

Young diabetics produce little of their own insulin and their disease runs an unstable, hard-to-control course. Dr. Sugar said the new drug, DBI (Phenformin), used in conjunction with insulin injections, provide finer control. The same holds true in adult unstable diabetics.

Other oral drugs, Dr. Sugar said, provide similar control, but to a lesser degree.

Science News Letter, August 29, 1959

their children's success in their chosen fields and their willingness to help wherever possible. Otherwise, the group includes a great variety of professions, religious backgrounds, degrees of education, and viewpoints.

Although nearly three-fourths of the fathers and 60% of the mothers continued their education beyond high school (attaining, among them, 11 master's degrees, four M.D.'s, 2 LL.B.'s, and four Ph.D.'s), in 20% of the families neither parents received any higher education. There are or have been scientists somewhere in the family background of 23, or 57.5% of the 40 talented young scientists; but, conversely, no scientists are recorded on 42.5% of the family trees.

A general conclusion to be drawn from this study might be that a child with the necessary abilities is most likely to become a productive scientist if he is given, early and always, as many opportunities as it is possible to devise to discover for himself the great challenging adventure of science. Then, with encouragement enough to convince him that he can meet the challenge, he may choose to spend all the years of his life searching for elusive answers and for frontiers beyond the frontiers of knowing.

Science News Letter, August 29, 1959

October

SCIENCE YOUTH MONTH

OCTOBER 1959						
S	M	T	W	T	F	S
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

To inspire and inform youth in our schools as to the opportunities, need and qualifications of scientific and technological manpower.

Millions of youths in schools, science clubs, and science fairs throughout the nation provide the nucleus of this month-long emphasis on science activities for the new school year.

✓ Check YOUR action program . . . NOW

☐ General . . .

Emphasize the wide range of careers in science and the variety of abilities and interests that are needed.

Dramatize the lifelong adventure of being part of the scientific community, of sharing the exciting challenge and rewards of searching for new knowledge.

Recognize the importance of brainpower as well as manpower.

☐ Business and Industry . . .

Advertising—produce National Science Youth Month posters; organize a poster contest among students; suggest featuring NSYM in appropriate advertising of books, scientific equipment, etc.

Stores, banks, etc.—display science fair projects in windows, lobby; tie in NSYM with window displays of appropriate merchandise; highlight NSYM in book, toy, optical, hobby, electrical equipment, etc. departments.

Industries that employ scientists—arrange student-teacher tours of laboratories; offer to provide speakers for PTA, science club, civic organization meetings on the importance of science, the significance of NSYM, scientific careers; offer project counseling to student-scientists; make scientific library available to qualified students or to their teachers and club sponsors.

☐ Community . . .

Libraries, museums—feature special displays tied in with NSYM; arrange programs relevant to NSYM; display outstanding projects done for science fairs and the Science Talent Search.

Civic organizations—invite science teachers, scientists, science students, science fair and Science Talent Search winners to speak at meetings; honor outstanding teachers, students, scientists.

Youth organizations—feature science in Boy and Girl Scouts, Campfire Girls, YW and YMCA, Boys' Clubs, 4-H, etc. Give recognition and awards for science projects of members.

Organizations and individuals—give practical support to honoring and rewarding science achievement at least as much as athletic triumphs. Join in educating the whole community on the importance of encouraging the development of young scientists, engineers and technicians.

Consider forming a permanent organization of civic groups, professional societies, universities, newspapers and industries to sponsor science fairs, work for better science education, arrange for career counseling, act as a catalyst for contacts between scientists and students.

Plan the October PTA meeting as "Science Night." Invite a scientist as speaker; ask students and teachers to cooperate in featuring school science activities; honor the science faculty; bring PTA up to date on science awards won by students in the past year; exhibit awards and some of the best science projects.

☐ Teachers . . .

Request Oct. 15 Science Talent Search examinations for your most promising senior science students. Encourage them to finish their research papers in plenty of time. (Exams mailed Nov. 15.)

Sponsor a science club if not already doing so. A copy of the Sponsor Handbook, issued without cost to sponsors by Science Clubs of America, will answer questions and offer suggestions.

Plan this year's science fair, appoint committees. (If this is your first, write Science Service for help in organizing.)

Find a regional or state fair you can join, if you haven't already done so, to make it possible for your winners to compete with others to go on to the National Science Fair.

Ask cooperation from the school faculty in featuring science in mathematics, English, history, art, etc.

Give recognition to top science students, their accomplishments and plans, in school papers and magazines, news bulletins.

Ask librarians to display new science books and science magazines and journals.

Offer to advise, or to find a professional scientist-advisor, on individual science projects of students.

Ask your high school principal for information about the National Merit Scholarship Program.

Request student entry materials for the Science Achievement Awards for Students program. Available from the Future Scientists of America Foundation of NSTA.

☐ Students . . .

Join the Science Club. (If your school doesn't have one, join with other interested students to start one.)

Plan "how-to-do-it" sessions to share ideas and techniques in exhibiting science fair projects.

Encourage school science fairs in elementary and junior high schools.

Feature science this month in your radio, auto, etc., clubs.

Register with your science teacher for the Science Talent Search examination (if you are a senior), and keep working on your research project, paper due in December.

Plan a "career" meeting for your club. Consider asking a scientist or panel of scientists to discuss careers in science.

For the fourth year, October is being designated as National Science Youth Month. Thirty-four national groups have joined with Science Service in organizing this national emphasis on science youth activity. The National Science Youth Program of Science Service, of which Science Youth Month is a part, is supported in part under a grant from the National Science Foundation.

SCIENCE IS STRENGTH. TODAY'S YOUTHS ARE TOMORROW'S SCIENTISTS.

Cooperating in National Science Youth Month:

American Association for the Advancement of Science

The AAAS administers a Traveling High School Science Library Program and a Traveling Elementary School Science Library Program, sponsored by the National Science Foundation, to stimulate interest in and choice of careers in science and to assist in improving school instruction in the sciences and mathematics. These libraries are on loan in 1959-60 to approximately 1,700 high schools and preparatory schools and 800 elementary schools. Applications for 1960-61 are invited from principals and headmasters. Address Dr. H. J. Deason, AAAS, Annotated catalogues of the traveling libraries are available at 25c each. Also available are an annotated list of paperback science books (25c) and a comprehensive list of science books recommended for high school and public libraries (\$1.00). Send orders to AAAS Publications.

Under a new grant from the Carnegie Corporation of New York, the Science Teaching Program of AAAS is sponsoring a project on Studies in Teacher Education with the cooperation of Bucknell and Emory Universities, Hunter College, and the University of Tennessee. Another study on the Use of Special Teachers of Science in grades 5 and 6 will be carried out in Cedar Rapids, Iowa, Lansing, Mich., Washington, D. C., and Versailles, Ky. Small research grants have been made available to staff members in small colleges. A requirement of the research project is that it involve preservice science teachers. A quarterly newsletter, called *Science Education News* reports education activities of scientific societies.

Junior Academies of Science are encouraged through AAAS-affiliated State and City Academies of Science. A Junior Scientists' Assembly is sponsored each year at the annual meeting. Grants are given for student projects through the Senior Academies. AAAS, 1515 Massachusetts Avenue, N. W., Washington 5, D. C.

American Cancer Society

The ACS is carrying out an active career-incentive program. Most ACS local Units and Divisions can provide cooperation and support for local career programs and activities. A number of ACS Divisions have provided special training grants for careers in medical technology, and other types of scholarships relating to career training have been granted in some instances. Materials and information on cancer may be obtained without charge by students, teachers and others upon request to their local ACS Unit. Write: Public Education Division, American Cancer Society, Inc., 521 West 57th St., New York 19, N. Y.

American Chemical Society

Each year about 5,000 of the nearly 90,000 ACS members volunteer to give such personal assistance to high school science teachers as these teachers request. This year ACS members are particularly excited about the possibilities of the "Continental Classroom" in modern chemistry which will start in September and continue until June, 1960. This nationally televised course is aimed specifically at the high school teacher of chemistry. Some of his outstanding students undoubtedly will want to watch the course. Special assistance in connection with this course and other projects can be obtained through ACS members in more than 150 local sections throughout the country. If teachers want further information about careers in chemistry or chemical engineering, summer employment opportunities, speakers, consultants and the like, they

should consult local section officers. Their names and addresses and other information can be obtained from: American Chemical Society, 1155 16th Street, N.W., Washington 6, D. C.

American Dental Association

All state and local dental societies are being urged to participate in science fair activities. Dental societies and dental schools in many localities are prepared to offer advice and material assistance to science teachers and students. The Association presents four awards for outstanding exhibits in dental and allied science at the National Science Fair. Two Certificates of Superior Achievement carry with them an invitation to the American Dental Association Annual Session and two Certificates of Meritorious Achievement entitle winners to gifts of books or equipment. A booklet, *Dental Projects for High School Science Students*, is available without charge from many local dental societies; single copies from Science Service (25c handling charge; 20c each for 10 or more). Dental health and hygiene information described in the Catalog of the ADA (single copy on request) provides some additional background material for science projects.

Address: Dr. Sholom Pearlman, American Dental Association, 222 East Superior Street, Chicago 11, Illinois.

American Federation of Labor and Congress of Industrial Organizations

The AFL-CIO supports better schools and encourages scientific education in every possible manner and at all levels. Many of its affiliated unions conduct apprenticeship schools to transmit skills to young apprentices and the latest scientific processes to journeymen members. Central labor organizations and local unions of skilled workmen in almost every community in the nation stand ready to help pupils with their science projects, clubs and fairs. Students wanting assistance are invited to contact the local union bodies in their home-towns or to write the AFL-CIO Public Relations Department at 815 16th Street, N.W., Washington 6, D. C.

American Medical Association

County and state medical societies cooperate with local science fairs by joining in sponsoring committees, giving special awards and scholarships, providing transportation to the National Science Fair, arranging counseling, etc. The American Medical Association presents four citations at the annual National Science Fair and the two top AMA award winners are guests at the AMA annual meeting. A 20-min., color, sound motion picture—*I Am a Doctor*; a large-scale exhibit on Medicine as a Career; and descriptive literature on the study of medicine are available from the AMA via local medical societies. For information and names of local medical society officers, write to Leo E. Brown, American Medical Association, 535 North Dearborn St., Chicago 10, Ill.

American Veterinary Medical Association

All state, territorial and provincial veterinary associations are being encouraged to lend every assistance to students toward the development of proper scientific attitudes and techniques. Effective aid to science fair personnel through these associations and their Women's Auxiliaries is being developed. A booklet "Veterinary Medicine As A Career," single copies free, additional copies 10c each. Sponsors may obtain a list of veterinary medical organizations to contact for direct assistance. The AVMA presents two Awards at the National Science Fair, top award winner is guest at the AVMA annual meeting. Address: Brian M. Forster, Director,

Public Information, 600 So. Michigan Ave., Chicago 5, Ill.

B'nai B'rith Women

B'nai B'rith Women participates actively with and contributes financially to three major youth services, namely: B'nai B'rith Youth Organization, Hillel Foundations and Vocational Service.

In these services, direction of young people is carried on by professionally trained personnel. Supervised leisure time activities provide background for youth to explore and express individual interests and learn skills, while developing healthy patterns of human relationships and fulfillment of family and community responsibilities.

Career clinics are conducted to provide guidance in the selection of suitable careers. Through Hillel, B'nai B'rith Women offers scholarships for worthy and needy students. Write: B'nai B'rith Women, 1640 Rhode Island Ave., N.W., Washington 6, D. C.

Chamber of Commerce of the United States

Over 2,200 Chambers of Commerce now have Committees on Education. These committees have been alerted to the nation's manpower problems and to the need for better career planning by young people. Many chambers have cooperated with school officials in planning and conducting "Career Conferences for Teen-agers." Business and professional men in every community are ready to work with teachers and administrators to improve guidance programs, to develop science fairs or to secure materials, equipment or work experience to make science teaching more effective. For further information consult your local Chamber of Commerce or the U. S. Chamber of Commerce at 1615 H Street, N.W., Washington 6, D. C.

Department of Defense

The Department of Defense cooperates with individuals and groups in providing guidance and assistance on projects which are designed to stimulate interest in scientific pursuits. This guidance and assistance includes speakers' programs, film presentations, furnishing of instructional and informational materials, demonstrations, exhibits and displays of military products, installation tours and briefings, and assistance in certain forms of scientific experimentation. Inquiries may be addressed to the Commanding Officers of local military installations.

Thomas Alva Edison Foundation

The Edison Foundation directs programs to encourage more boys and girls to undertake careers in science and engineering. The Foundation conducts a public information program on behalf of improving the quality and quantity of science education. Science Youth Day, held annually on Thomas Alva Edison's birthday, February 11, is a nation-wide program to interest young people in science and engineering. Participating in this International Edison Birthday Celebration are major companies of American industry, governmental agencies, professional, scientific and educational societies, and other groups in the United States and abroad. Science experiment booklets and other free materials are distributed nationally to students. Special student visits to industrial plants and research and development laboratories are arranged. The Foundation also organizes national conferences and Edison Institutes on scientific manpower and science education problems. Awards are also given in the mass media to encourage better program material in sciences. In cooperation with NBC the Foundation produces a weekly science television program on which outstanding high school Science Fair winners and professional scientists appear. A

list of publications available may be secured by writing to Thomas Alva Edison Foundation, Inc., 8 West 40th Street, New York 18, New York.

Engineering and Science Organizations

Each field of engineering has its own professional society and some of these, including the so-called founder societies, are represented by the Engineers Joint Council, 29 West 39th St., New York, N. Y. Problems of education, personnel training, and utilization, are the concern of the Engineering Manpower Commission at the same address, while Scientific Manpower Commission, 1507 M St., N.W., Washington 5, D. C., performs the same function for scientific organizations. Teachers and others may make inquiries on special problems in connection with science, technology, and careers. The Scientific Manpower Commission also may be consulted on Selective Service and other military problems faced by teachers and students of mathematics and science.

Future Engineers of America

FEA holds periodic tournaments for High School students, freshmen to seniors, interested in getting ahead on their own. Last year through voluntary self study, over 1,000 students from 10 states learned advanced topics in mathematics and solved engineering problems furnished by industrial companies. Self-study kits were supplied in advance, then the students came to two tournaments in the Chicago area to demonstrate what they had learned. The winners took home some 60 prizes ranging in value to \$100. This year, the FEA is expanding this 'do-it-yourself' program to include some 15,000 students. Local contests in schools will be held by the end of October, it is planned. Self-study kits are to be furnished as part of \$2 entry fee. National grand tournament will probably be held in Chicago area, November 27. Events planned include slide rule contests, brainteaser test, math power test, etc. Obtain details by writing Future Engineers of America, 304 W. Randolph Street, Chicago 6, Illinois.

Junior Engineering Technical Society

Program designed to stimulate and encourage interest in engineering, applied science and mathematics among high school students. JETS chapters are sponsored in high schools by local industry and/or professional groups throughout the United States and two foreign countries. JETS provides free materials for initiating and operating the chapters. The program includes a National Project Exposition with awards and scholarships. JETS offers the students an opportunity to explore the various technical fields and to compare attitudes, interests and abilities with the requirements of technical professions through actual experiences and contacts with these professionals. For information, write to JETS, P.O. 589, East Lansing, Michigan.

Manufacturing Chemists' Association, Inc.

This organization representing the manufacturing chemical industry executes an aid-to-education program that embraces all levels from kindergarten through college. For information on entire MCA program, request free copy: An Industry Helps Our Schools. Counselor's handbook on qualifications for and opportunities in industry careers scheduled for release about September 15, 1959; program of experiments (emphasis on chemical principles for elementary school teachers and science club leaders) scheduled for release February 1, 1960. Other publications free to educators include: Your Food and Chemical Research, brochure on food pro-

duction and processing; Crops and Chemicals, pamphlet on crops and processing and preservation; Chemical Industry Facts Book, single copies with Teachers Guide, 44c to educators. Address: Manufacturing Chemists' Ass'n., Inc., 1825 Connecticut Avenue, N.W., Washington 9, D. C.

National Academy of Sciences-National Research Council

Through its Advisory Board on Education the National Academy of Sciences-National Research Council works with individual scientists and scholarly organizations for improvement of education in the sciences at all levels. Principal attention is given to programs designed to improve the preparation of teachers, at graduate and undergraduate levels, and to expansion of opportunities for continual professional development. Action is also being taken through Committees to promote better planning for production and use of films and television in science education. In cooperation with local and national industries and associations, community action is promoted to develop better local understanding and support of schools. Publications and information may be obtained from: Dr. R. M. Whaley, Advisory Board on Education, National Academy of Sciences-National Research Council, 2101 Constitution Ave., N.W., Washington 25, D. C.

National Association of Broadcasters

The National Association of Broadcasters, which comprises more than 2,200 individual stations and all seven nationwide radio and television networks, has been conducting an industrywide public service project with the theme, LEARN-AND LIVE. The project seeks to stimulate curiosity and inspire young people to grow to their full intellectual capacities and to impress upon their parents their duty to guide and support youth in obtaining more knowledge and training. As part of their activities, broadcasters throughout the country have participated, with a select group of organizations outside of broadcasting, on projects which are in harmony with LEARN-AND LIVE. During October, NAB members will observe National Science Youth Month by emphasizing the excitement and adventure young people can experience through scientific pursuits. NAB will provide members with spot announcements and other material to aid them in their community participation. For information about the LEARN-AND LIVE campaign, write: National Association of Broadcasters, 1771 N St., N.W., Washington 6, D. C.

National Association of Manufacturers

By encouraging study of science and mathematics in schools, cooperation with local and regional science fairs and the National Science Fair, the NAM Committee on Research and Education Department is promoting development of science talent. Career booklets, "Your Career in Industry as a Scientist and Engineer," and "Your Opportunities in Industry as a Technician," have been distributed in large numbers. Copies free on request. Address: Education Department, National Association of Manufacturers, 2 East 48th Street, New York 17, New York.

National Aviation Education Council

To help secondary school teachers stimulate interest in science or mathematics as they relate to aviation, National Aviation Education Council publishes *Science Teaching Aids for a Stronger America* (75c) and *Mathematics Teaching Aids for a Stronger America* (75c). These books offer suggestions for using aviation

facts and principles in science and mathematics classrooms; also, hundreds of bibliographical references. A companion book, *Guidance Aids for a Stronger America* (75c), is a handbook for guidance counsellors, illustrating how scientists and mathematicians, among other professional and technically skilled workers, are employed in the aero/space industry. *U. S. Aircraft, Missiles, and Space Craft 1959* (\$1.00) describes (with many pictures) the products of the U. S. aero/space industry today. More than 32 pages of this 152-page book are devoted to missiles and space craft. *The Space Frontier* (25c) gives facts about space and space exploration and includes a space age glossary of more than 200 terms. Established for the purpose of providing aviation and space information to schools, libraries, and individuals, NAEC offers for \$5.00 a year a mailing service through which subscribers receive single copies of all NAEC books published during the membership year, monthly copies of *Planet*, *National Aeronautics*, and *Skylights*, a selection of several previously published books, and monthly packets of up-to-date booklets, pamphlets, charts, pictures, and instructional materials produced by the aero/space industry. Free teaching aids such as units on rockets and space travel, bibliographies, and a source book (*Pictures, Pamphlets, and Packets*) of free and inexpensive teaching aids relating to aviation and space exploration are also available. Address: National Aviation Education Council, 1025 Connecticut Ave., N.W., Washington 6, D. C.

National Committee for Careers in Medical Technology

This committee helps to promote summer jobs in hospital pathology laboratories for outstanding science students attaining honors at local and regional fairs and the National Science Fairs. It also distributes career guidance information, including pamphlets and films describing the profession of medical technology, and including data on aptitudes, training, qualifications, and salaries. NCCMT is sponsored by three professional organizations, the American Society of Clinical Pathologists, the American Society of Medical Technologists and the College of American Pathologists. Address: National Committee for Careers in Medical Technology, 1785 Massachusetts Avenue, N.W., Washington 6, D. C.

National Merit Scholarships

National Merit Scholarships are four-year college scholarships available to high school seniors. The stipend accompanying each scholarship is based on need and may vary from \$100 to \$1,500 a year. The average stipend is now about \$730 a year. The winners choose their college and curriculum during the competition. The college receives an educational supplement for each Merit Scholar in attendance. Last year 745 Merit Scholarships were awarded, including some 417 Merit Scholarships offered by and named for 90 business organizations. Registration for the Merit Scholarship Program is by high school. The National Merit Scholarship Qualifying Test, the first step in the annual competition, is administered to second-semester juniors and first-semester seniors in the spring of each school year. Each principal is sent registration materials in October. Any eligible student may take the examination at the cost of \$1.00. The 1959-60 competitions began with the National Merit Scholarship Qualifying Test in April, 1959. Winners will be announced in the Spring of 1960. The test for the 1960-61 competition will be given either Tuesday, March 8, 1960 or Saturday, March 19, 1960, according to the preference of the school, to students who will graduate from high school in 1961. Since the inception of the Merit Program in 1955, some \$15.5 million in Merit Scholarships have been awarded to 3,132 students. For

additional information see your principal or write National Merit Scholarship Corporation, 1580 Sherman Avenue, Evanston, Ill.

National Science Fair

About 600,000 young scientists in junior and senior high schools annually undertake science projects and build exhibits to be shown in thousands of science fairs in their high schools. The best of these compete in some 180 regional and area science fairs, which send their two top finalists, usually a boy and a girl, to the National Science Fair, conducted by Science Service, each May. The Eleventh National Science Fair will be held May 11-14, 1960 in Indianapolis, Ind. Local organizations, including newspapers, public, private and parochial schools, colleges, industries, scientific and technical societies, clubs, etc., cooperate in local and regional fairs. Science Service offers full information in conducting science fairs. Write Science Service, 1719 N St., N. W., Washington 6, D. C.

National Science Foundation

This agency of the Federal Government conducts an extensive program of support and stimulation to science and research, including scientific personnel and education. Most of its operations are through grants that facilitate activities by other organizations. Extensive programs in science education include support of institutes, summer fellowships, and other training programs for high-school teachers of science and mathematics; limited summer programs for high-school students of science and mathematics; traveling science libraries and traveling science demonstration lectures; fellowships for graduate students and advanced scholars in science, mathematics, and engineering; and projects for the improvement of course-content materials and the development of new teaching and learning aids in science and mathematics. For information about these programs, write for: "National Science Foundation Programs for Education in the Sciences," National Science Foundation, Washington 25, D. C.

National Science Teachers Association

A department of NEA, an affiliate of AAAS. Regular membership, \$6; includes 8 issues of THE SCIENCE TEACHER and the Packet Service. Publications to help students include: *Encouraging Future Scientists: Student Projects*—examples of prize-winning science projects done by students. *If You Want To Do a Science Project*—suggestions to help students plan, carry through, and report science projects. Single copies, 50¢; discounts—2 to 9 copies, 10¢; 10 or more copies, 20¢. Orders for \$1.00 or less must be accompanied by remittance. *Encouraging Future Scientists: Keys to Careers*—bibliography of science career information and guidance material. *Careers in Science Teaching*. Single copies free. Order from: National Science Teachers Association, 1201 16th St., N.W., Washington 6, D. C.

New England Council

The New England Council has established a Program of Industry Aids to Education, specifically designed to provide a means through which industry, the professional societies and schools may work together. The Program is developing this link first in the sciences and math at the secondary and elementary school level on the basis that industry has, through knowledge, experience and resources, the tools to help meet many of the schools' needs. The Program plans to have available various listings of industry's resources throughout New England, as well as source material that should be very valuable to teachers. Write Robert M. Burnett, Industry Aids to Education, New England Council, Statler Building, Boston 16, Massachusetts.

Oak Ridge Institute of Nuclear Studies

The Oak Ridge Institute of Nuclear Studies is a nonprofit educational corporation of southern universities, operated under direct contract with the U. S. Atomic Energy Commission. Its many activities include the administration of a "traveling-teacher" program, several graduate fellowship programs, traveling atomic-energy exhibits, and student tours of nuclear facilities, the presentation of courses in the use of isotopes, special courses for teachers, and symposia and conferences: the maintenance of a medical-research hospital, a museum of atomic energy, and a technical library; and the provision of lecturers for universities, research opportunities for university scientists, and a mobile radio-isotopes laboratory for on-campus college training.

Science Achievement Awards for Students

For students in grades 7 through 12; 220 regional and national awards (value, \$14,000) based on reports of individual projects in science. Sponsored by the American Society for Metals, conducted by the Future Scientists of America Foundation of the National Science Teachers Association. Closing date for entries in 9th annual program: March 15, 1960. Student entry materials available now from National Science Teachers Association, 1201 16th St., N.W., Washington 6, D. C.

Science Clubs of America

More than 600,000 youths are in some 25,000 Science Clubs of America. Any adult sponsor (usually teacher) is invited to affiliate groups, clubs, classes, and receive free annual SCA sponsor handbook in fall and other useful literature throughout the year. Write to: Science Clubs of America, 1719 N Street, N.W., Washington 6, D. C., and say: "Affiliate my science club."

Science Service

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Science Talent Search

High school seniors have a chance to win trips to Washington, share in a total of \$34,250 in Westinghouse Science Awards and Scholarships, and be recommended for admission and support in college. The Nineteenth Annual

Science Talent Search for seniors of 1960 is held in the fall of 1959. Teachers should ask for examinations about Oct. 15. Seniors should be working on their projects and reports during the summer. Completed entries must arrive at Science Service not later than midnight, December 27, 1959. Science Talent Search is conducted by Science Clubs of America, a Science Service activity, and sponsored by the Westinghouse Educational Foundation. Ask for "How to Search for Science Talent" sent free on request. Science Service, 1719 N St., N.W., Washington 6, D. C.

Scientific Apparatus Makers Association

This organization represents some 225 of the nation's principal manufacturers and dealers in the scientific laboratory and equipment industry and is vitally concerned that educators and students of all levels of education have at their disposal the finest and most up-to-date tools of their profession. Through yearly awards, cooperation with Federal educational agencies and direct liaison with leading professional societies, the SAMA supplements its member companies' efforts to better prepare our nation's scientists and engineers for tomorrow's space and air age. The following leaflets and reprints of published articles are available without charge:

Selected Bibliography on Science Education and Careers, A Guide to Evaluating Your Science Facilities, Your Career With the Instrument and Control Industry by the Recorder-Controller Section, How to Help Your Town's Editor, I Am the Science Teacher, SAMA Motion Picture Film Directory. Address: Director of Public Information, Scientific Apparatus Makers Association, 20 No. Wacker Drive, Chicago 6, Ill.

U. S. Air Force and Air Force Association

The United States Air Force has indicated that it will participate in future National Science Fairs on an enlarged basis, with the cooperation of the Air Force Association. Additional awards are scheduled in categories other than the Air Power and Air Exploration areas which were selected at previous National Science Fairs. Plans call for recognition at the Regional and State levels in addition to the National finals. Complete details will be forwarded to all fair directors.

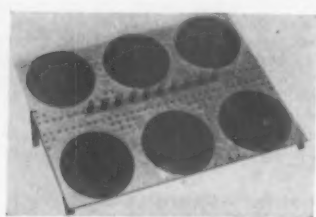
U. S. Army

A week at the Army Ballistic Missile Agency, Huntsville, Ala., Army Medical Center, Washington, D. C., Army Signal Center, Fort Monmouth, N. J., or the Army Chemical Center, Fort Holabird, Md., depending on the interest of the student, is given to eight finalists at the National Science Fair; exhibits are judged best in the specialized area of missiles, satellites, electronics, calculators, mathematics, high and low temperatures, instrumentation, meteorology and medicine.

U. S. Navy

The Department of the Navy requests each fair affiliated with the National Science Fair to select one male sophomore or junior high school student whose exhibit is considered best in the broad area of Navy-oriented projects. District Commandants and members of Naval Reserve Units are requested to contact the Director of these science fairs, and offer to assist the judges in the selection of winners to be designated as Navy Science Cruisers. One student from each fair will be given an opportunity to see science in the Navy for about one week on fleet ships at sea. The U. S. Navy judges will honor seven students at the 11th National Science Fair.

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THE ADOPTION OF NEW PRODUCTS: Process and Influence—Foundation for Research on Human Behavior, 60 p., illus., paper, \$3. New research findings on social factors important in the adoption of new products, methods and ideas.

ADVANCED ENERGY SOURCES AND CONVERSION TECHNIQUES: Proceedings of a Seminar, Vol. I—U. S. Dept. of Defense with Calif. Inst. of Technology—Off. of Tech. Serv., 260 p., illus., paper, \$4. Discussion of chemical, thermal, solar, nuclear and other devices of energy conversion.

BEHAVIOR OF ENZYME SYSTEMS: An Analysis of Kinetics and Mechanism—John M. Reiner—Burgess, 317 p., \$6.50. A practical handbook for the mathematical analysis and diagnosis of metabolic behavior. For research workers who need tools for quantitative interpretation of their work.

CHEMISTRY IN THE LABORATORY—Jay E. Taylor and John R. Demuth—Burgess, 2nd ed., 242 p., illus., by C. C. Taylor, paper, \$3.75. Describes 36 experiments, ranging from Bunsen burner to formal qualitative analysis scheme.

THE DIESEL ENGINE: Its Theory, Basic Design and Economics—L. V. Armstrong and J. B. Hartman—Macmillan, 360 p., illus., \$8.75. Provides a comprehensive treatment of the Diesel engine.

DIGITAL COMPUTER PRIMER—Edward Mack McCormick—McGraw, 214 p., illus., \$7.50. Tells how computers work, what they can do, and explains their mathematical, engineering, electronic and accounting uses.

THE DRINKING PROBLEM AND ITS CONTROL—C. Anthony D'Alonzo—Gulf Pub. Co., 130 p., \$2.95. The assistant medical director of the Dupont Company discusses the personal, health, industrial and community aspects of alcoholism and its treatment.

EDUCATORS GUIDE TO FREE FILMSTRIPS—Mary Foley Horkheimer and John W. Diffor, Eds.—Educators Progress Service, 11th ed., 191 p., paper, \$6. Lists 743 titles, with subject and source index.

EXPOSURE MANUAL—J. F. Dunn, foreword by Percy W. Harris—Wiley, 2nd ed., 268 p., illus., \$7.50. Designed to help the amateur and professional photographer understand the basic requirements of exposure techniques and how to apply them.

THE FIRST BOOK OF COLOR—Herbert P. Paschel—Watts, F., 45 p., illus., by Caru Studios, \$1.95. A brief, easy-to-understand explanation of light and color, abundantly illustrated.

INDEX OF AMERICAN PALMS: Plates—B. E. Dahlgren—Field Mus. of Nat. Hist. (Chicago Nat. Hist. Mus.), 416 p., 412 plates, paper, \$10.

Reprint of 1936 publication, illustrating 412 species of palms described in the index.

INDUSTRIAL MICROBIOLOGY—Samuel Cate Prescott and Cecil Gordon Dunn—McGraw, 3rd rev. ed., 945 p., illus., \$17.50. Basic information on the use of yeasts, bacteria and molds in industrial processes. New chapters added on steroids, dextrins, gibberellins, amino acids and vitamins.

LABORATORY MANUAL FOR FOOD MICROBIOLOGY—W. C. Frazier and E. M. Foster—Burgess, 3rd ed., 131 p., paper, \$2.50. Describes 51 laboratory experiments.

LIGHTNING FACTS AND FIGURES—Lightning Protection Inst., 20 p., illus., paper, single copies free upon request direct to publisher, 53 W. Jackson Blvd., Chicago 4, Ill. About personal safety and protection of buildings.

LIQUIDS AND LIQUID MIXTURES—J. S. Rowlinson—Academic, 360 p., \$12. For graduate students, chemists and physicists, this book summarizes our present knowledge of liquids and their properties in terms of the intermolecular forces.

MARIE CURIE—Robin McKown Putnam, 128 p., illus., by Lili Rethi, \$2.50. Biography for young people.

NASA AUTHORIZATION FOR FISCAL YEAR 1960: Hearings, Part 1, Scientific and Technical Presentations—Committee on Aeronautical and Space Sciences (Govt. Print. Off.), 678 p., illus., paper, \$2. Excellent reference, which might serve as a textbook for science teachers who need basic materials on space exploration.

NOTES ON THE QUANTUM THEORY OF ANGULAR MOMENTUM—Eugene Feenberg and George Edward Pake—Stanford Univ. Press, 56 p., paper, \$1.25. To assist graduate students in reading papers on atomic, molecular and nuclear structure.

OFFICES IN THE SKY—Earle Shultz and Walter Simmons, foreword by Clarence B. Randall—Bobbs, 328 p., illus., \$6. The story of the development of the skyscraper from hazardous beginnings to their present state of safety, functional adaptability and beauty.

100 INDOOR PLANTS: Their Care and Cultivation—A. C. Muller-Idzerda, introd. by Vera Higgins—Emerson, 114 p., 100 photographs, \$2.95. Dutch authority on indoor plants gives each plant a page of description and advice on care.

101 WILDFLOWERS OF CRATER LAKE NATIONAL PARK—Grant and Wenonah Sharpe—Univ. of Wash. Press, 40 p., illus., paper, \$1. Black and white drawings, arranged according to color, facilitate identification.

PHYSICS: An Exact Science—Harvey E. White, with Eugene F. Peckman—Van Nostrand, 597 p., illus., \$5.96. The author, known to many from his televised "Continental Classroom" lectures, here presents a physics text for the able high school students.

PRINCIPLES OF PHYSICAL CHEMISTRY—William H. Hamill and Russell R. Williams, Jr.—Prentice-Hall, 607 p., illus., \$8.75. Intended for a two-semester introductory course in physical chemistry, covering the complete range of material, from classical to modern.

PROCEEDINGS OF THE FOURTH NATIONAL CONFERENCE ON TUBE TECHNIQUES—J. H. Bloom, Chm.—N. Y. Univ. Press, 270 p., illus., paper, \$7.50. Surveys the field of recent advances in electron tubes.

THE QUEST OF GALILEO—Patricia Lauber—Garden City Bks., 56 p., illus., by Lee J. Ames, \$2.50. Handsome picture-book style biography of the 17th century astronomer and founder of modern science.

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READING TECHNICAL FRENCH—Cecil Don McVicker—*Burgess*, 3rd rev. ed., 115 p., paper, \$2.50. Aims at teaching the student without previous background in French to read standard scientific or technical works.

SCIENCE AND HUMAN VALUES—J. Bronowski—*Harper*, 94 p., illus., paper, 95¢. Reprint of 1956 edition.

THE SCIENCE OF BIOLOGY—Paul B. Weisz—*McGraw*, 796 p., illus., \$7.95. Designed to serve both the terminal student of biology and the prospective major, the author's approach is determined by the results of modern research and his aim is analysis and synthesis, not mere cataloging of data.

SCIENTIFIC RUSSIAN WITHOUT TEARS—J. W. Perry—*The Chemical Bulletin*, 32 p., paper, \$1. Covers essentials of Russian alphabet, grammar, verbs and simple sentences for self-study.

TRANSPORT—Egon Larsen—*Roy Pubs.*, 64 p., illus., \$2.50. One of a British science series, designed to acquaint young readers with latest world developments in transportation.

TURBULENT TRANSFER IN THE LOWER ATMOSPHERE—C. H. B. Priestley—*Univ. of Chicago Press*, 130 p., \$3.75. A study of atmospheric disturbance near the ground, with new material for the specialist.

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WHEN A FAMILY FACES CANCER—Elizabeth Ogg—*Public Affairs Committee*, Pamphlet No. 286, 28 p., illus., paper, 25¢. To help the families of cancer patients meet the difficult physical and psychological problems they face.

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YOUR HEART AND HOW IT WORKS—Herbert S. Zim—*Morrow*, 64 p., illus. by Gustav Schrotter, \$2.50. A simple first introduction to the structure, workings and diseases of the heart.

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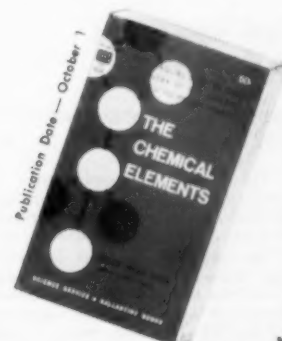
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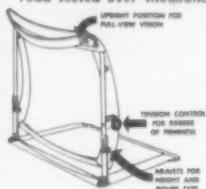
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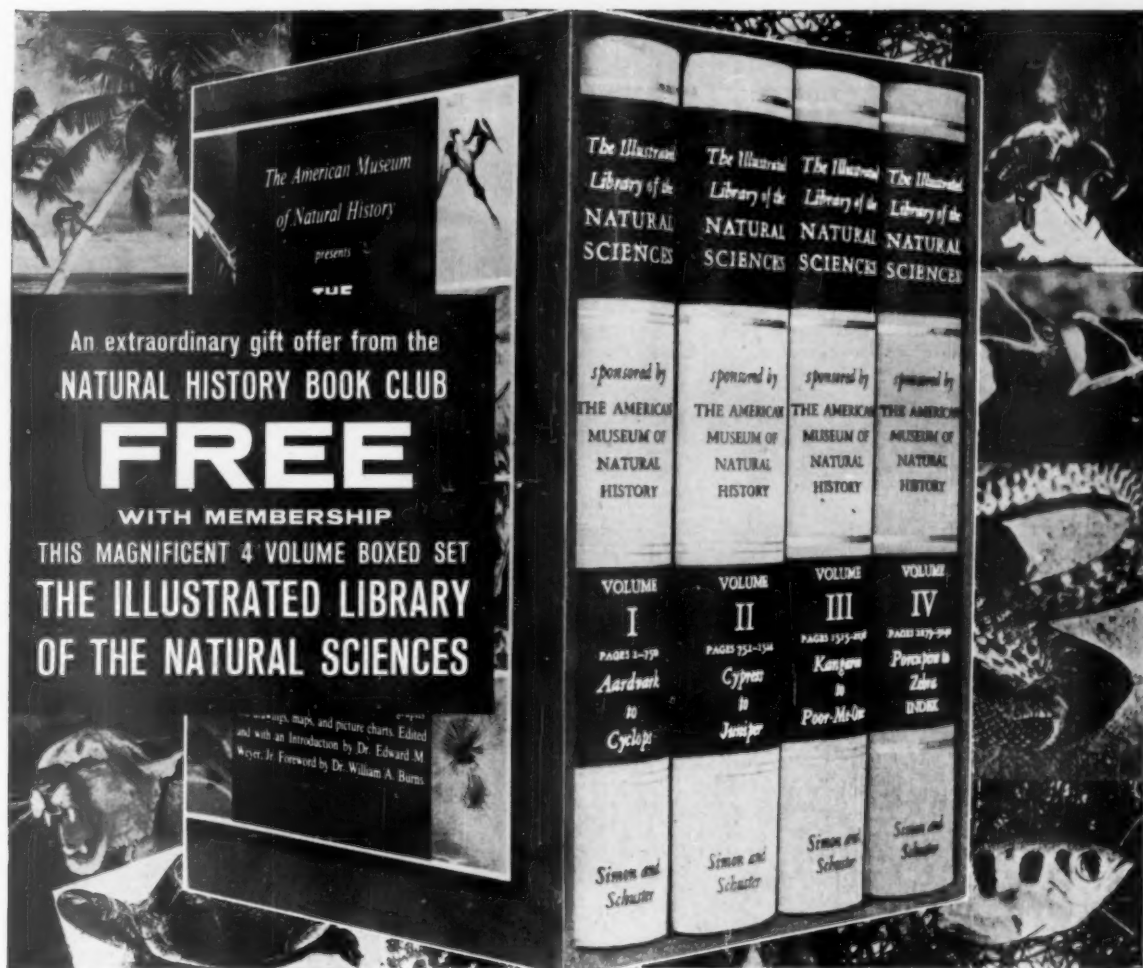
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New Machines and Gadgets

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SUN DIAL for the garden made of anodized aluminum is reportedly more accurate than an electric clock. Based on a new patent, the dial is preset at the factory for the latitude and longitude at which it will be used. A simple adjustment changes the sun dial to daylight time and back to standard time.

Science News Letter, August 29, 1959

GOLF TEE MARKERS made of butyrate plastic come with six-inch metal spikes that hold them firmly in place and leave tees unmarred. About four by five inches in size, the markers are weather resistant and will withstand rough handling and accidental blows. They come in red, white, blue or yellow.

Science News Letter, August 29, 1959

CHEMICAL SLIDE RULE shows relevant information about the elements including the electron structure, boiling points, terrestrial abundance, and ionization potential. By adjusting the plastic slide rule, the different groups of elements are shown. It is designed for chemists and for the classroom.

Science News Letter, August 29, 1959

DOOR MAT made of polyethylene weighs less than a pound and can be quickly cleaned by a hose or under a sink faucet.



The diamond design of the mat, shown in the photograph, allows ventilation for quick drying and permits mud, snow and dirt to be shaken off readily.

Science News Letter, August 29, 1959

RADIATION DETECTOR, smaller than a cigarette package, is self-contained and emits a loud "whine" when the radiation level becomes hazardous. The signal in-

creases in intensity as radiation increases. The low-cost, transistorized detector is designed for civil defense and peacetime application in the atomic energy field.

Science News Letter, August 29, 1959

ALL PURPOSE SCALE for home, office or shop use weighs from zero to 25 pounds by two-ounce graduations. The scale has a baked-on ivory enamel finish and red trim. Precision made mechanism is guaranteed for one year against mechanical defect.

Science News Letter, August 29, 1959

ALUMINUM PAINT for roofs and sidings is said to cool building interiors up to 15 degrees in summer and to retain heat in the winter. The paint can be applied on asphalt shingles, asbestos-cement shingles, composition roofing, slate, corrugated metal and tar paper. It comes in a variety of pastel shades.

Science News Letter, August 29, 1959

ANIMAL RESUSCITATOR designed for pets has a cone-shaped butyrate plastic face-mask. The transparent mask permits the operator to observe the pet during treatment. Oxygen flows from a cylinder into a bag and then, without assistance, into the animal's nose and lungs. Positive pressure resuscitation can also be applied.

Science News Letter, August 29, 1959



Nature Ramblings



By HORACE LOFTIN

THE OCEAN has been called the mother of life, for undoubtedly it was in the sea of thousands of millions of years ago that the first living thing appeared.

From a primeval protoplasmic beginning, a multitude of new kinds of living things evolved as the millions of years ticked off, filling all the livable areas of the earth's oceans, rivers and lakes.

From this watery beginning, plants and animals early in their history began to creep upward into the intertidal region, then the beach or river's edge, then to dry land itself, so that over the eons life became equally at home on the soil as in the water.

The last of the elements to be conquered by living things was the air. It is only lately (geologically speaking) that animals have taken wing. Insects probably were the first winged creatures. No other animals without backbones are known to fly.

The first backboneed animals appeared

Up in the Air



much later on the scene than the insects and it was many millions of years more before they took to the air.¹ Early examples can be seen in such forms as the flying fishes, which glide through the air for short distances. Some of the lizards also have developed membranes with which they may glide from tree to tree, but this of course is not true flight.

Fossil evidence, however, tells us of ancient winged reptiles, the pterodactyls, which were capable of sustained flight.

These all perished along with the dinosaurs.

But another reptilian line gave rise to creatures which ultimately evolved into the birds. Remains have been found of creatures which seem as much reptile as bird, but which had feathers and could fly. From such "feathered reptiles," our modern birds have emerged to dominate the air with the ease that a fish dominates the water.

Another offshoot of the reptiles led to the mammals. Alone of this group the bats have developed true flight. There are a few mammals like the "flying" squirrels which manage to sail through the air for short distances, but this falls far short of the goal of flight.

Thus, of all living creatures, only the insects, birds and bats have conquered the third element, the air, in the course of evolution. However, if man's domination of his environment through technology can be considered a new form of evolution, perhaps man deserves the title of conqueror of the air among the animals.

Science News Letter, August 29, 1959

